

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant : Kenichiro NAGASAKA
Serial No. : 10/822,199
For : ROBOT MOVEMENT CONTROL SYSTEM
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745 Fifth Avenue
New York, NY 10151
Tel. (212) 588-0800

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DeAndre Breeland
(Name of person signing transmittal)

Signature
July 29, 2008
Date of Signature

PRE-APPEAL BRIEF REQUEST FOR REVIEW

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

In response to the Final Office Action dated April 29, 2008, having a three-month statutory period for reply set to expire on July 29, 2008, Applicant submits this Pre-Appeal Brief Request for Review. Applicant presents a list of Rejections to be reviewed, a Brief Summary of the Claimed Invention, a Statement of Facts, and an Argument section setting forth reasons that the rejection is improper.

I. REJECTIONS TO BE REVIEWED

Claims 1, 2, 4-9, and 11-12 were rejected under 35 U.S.C. §102(b) as allegedly anticipated by U.S. Patent No. 5,294,873 to Seraji (hereinafter, merely “Seraji”).

Claims 3 and 10 were rejected under 35 U.S.C. §103(a) as allegedly unpatentable over Seraji in view of U.S. Patent No. 6,853,881 to Watanabe et al. (hereinafter, merely “Watanabe”).

II. BRIEF SUMMARY OF CLAIMED INVENTION

The present claimed invention is directed to a movement control system for a legged walking robot.

III. STATEMENT OF FACTS

Independent claims 1 and 8 recite “conditions corresponding to constraints regarding to an original point position of a link, a link posture, a gravity center position of a link, a joint angle, a gravity center position of the robot, or an entire angular momentum”. (see page 23, lines 8-16, page 27, lines 15-20) Specifically, a gravity center position of a link (see numerical formula 17 and 18 at pages 36 and 37), a gravity center position of the robot (see numerical formula 23 and 24 at pages 39-40), and an entire angular momentum (see numerical formula 29 and 30 at pages 42-43) are used for controlling the robot.

Independent claims 7 and 8 recite “wherein the redundancy drive-method is set to minimize system state changes and target state deviation.” (see page 28, lines 18-21) The target state deviation of a joint angle is shown in numerical formula 35 at page 45.

Seraji relates to redundancy control of a robot. Seraji describes a static point torque due to a point mass in equation 7, an objective function of the static point torque in

equation 8, and a joint dynamics in equation 10. Seraji further describes an optimization of the objective function in equations 6, 9, and 13.

IV. ARGUMENT

Claim 1 recites, *inter alia*:

“...wherein movement constraint-conditions comprises conditions corresponding to constraints regarding to an original point position of a link, a link posture, a gravity center position of a link, a joint angle, a gravity center position of the robot, or an entire angular momentum” (emphasis added)

The Office Action (see page 3) and the Advisory Action (see pages 3) rely on equations 1-10 of Seraji to reject the above-identified features of claim 1. Specifically, equations 7, 8, and 10 are used to reject constraints regarding to a gravity center position of a link, a gravity center position of a robot, and an entire angular momentum respectively.

Equation 7 of Seraji expresses the static joint torque by the gravitational acceleration, the payload, and an end-effector jacobian matrix. Nothing of the gravitational acceleration, the payload, and the end-effector jacobian matrix in equation 7 discloses or suggests a gravity center position of a link.

Equation 8 of Seraji calculates the objective function of the static joint torque by adding weighted squares of the static joint torque. Again, nothing in equation 8 discloses or suggests a gravity center position of a link or a gravity center position of a robot.

Equation 10 of Seraji expresses dynamics of a typical joint. The inertia in Equation 10 is multiplied by angular acceleration, evidenced as the second derivative of the joint angle. Applicant respectfully submits that the multiplication of inertia with angular acceleration is not angular momentum that relates to angular velocity, the first derivative of an angle.

Therefore, Applicant respectfully submits that claim 1 is patentable.

For reasons similar to those described above with regard to independent claim 1, independent claim 8 is also patentable.

Claim 7 recites, *inter alia*:

“...wherein the redundancy drive-method is set to minimize system state changes and target state deviation.” (emphasis added)

The Office Action (see page 4) relies on column 24, lines 5-column 29, lines 40 to reject wherein the redundancy drive-method is set to minimize system state changes and target state deviation, as recited in claim 7 (emphasis added). The cited portion of Seraji teaches an optimization method of the objective functions (see equation 89). Seraji describes that “the projection of the gradient of the objective function onto the null-space of the end-effector Jacobian must be zero for optimality.” (see column 26, lines 50-55) Applicant respectfully submits that the objective functions such as equations 6, 9, and 13 do not involve a target state such as a target joint angle. Applicant respectfully submits that the null space of Seraji does not involve a target state. Therefore, the optimization method of Seraji does not minimize...target state deviation, as recited in claim 7.

Therefore, Applicant respectfully submits that claim 7 is patentable.

For reasons similar to those described above with regard to independent claim 7, independent claim 8 is also patentable.

The other claims are dependent from one of the independent claims discussed above, and are therefore patentable for at least the same reasons.

Please charge any additional fees that may be needed, and credit any overpayment, to our Deposit Account No. 50-0320.

Applicant respectfully requests early passage to issue of the present application.

Respectfully submitted,

FROMMER LAWRENCE & HAUG LLP
Attorneys for Applicant

By



Thomas F. Presson
Reg. No. 41,442
(212) 588-0800